

SEQUENCE LISTING

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<120> RECOMBINANT PLANT EXPRESSING NON-COMPETITIVELY BINDING Bt INSECTICIDAL
 CRYSTAL PROTEINS

<130> 021565-078

<140> 09/661,061

<141> September 13, 2000

<150> PCT/EP90/00905

<151> 1990-05-30

<150> GB 89401499.2

<151> 1989-05-31

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<170> PatentIn Ver. 2.0

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 Arg Leu Glu Thr Gly Asn Thr Val Ala Asp Ile Ser Leu Gly Leu Ile
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Pro Ala Leu Arg Glu Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser	
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His	Ala	Lys	Arg	Leu	Ser	Asp	Glu	Arg	Asn	Leu	Leu	Gln	Asp	Pro	Asn	660	665	670
Phe	Arg	Gly	Ile	Asn	Arg	Gln	Pro	Asp	Arg	Gly	Trp	Arg	Gly	Ser	Thr	675	680	685
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Arg	Ala	Glu	Lys	Lys	Trp	Arg	Asp	Lys	Arg	Glu	Thr	Leu	Gln	Leu	Glu	865	870	875
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Val	Asn	Ser	Gln	Tyr	Asp	Arg	Leu	Gln	Ala	Asp	Thr	Asn	Ile	Ala	Met	900	905	910
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Pro	Glu	Leu	Ser	Val	Ile	Pro	Gly	Val	Asn	Ala	Ala	Ile	Phe	Glu	Glu	930	935	940
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Ile	Ile	Lys	Asn	Gly	Asp	Phe	Asn	Asn	Gly	Leu	Leu	Cys	Trp	Asn	Val	965	970	975
Lys	Gly	His	Val	Glu	Val	Glu	Glu	Gln	Asn	Asn	His	Arg	Ser	Val	Leu	980	985	990

Val Ile Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val Cys
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Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn Thr Asp Glu
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Leu Lys Phe Asn Asn Cys Val Glu Glu Glu Val Tyr Pro Asn Asn Thr
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Val Thr Cys Ile Asn Tyr Thr Ala Thr Gln Glu Glu Tyr Glu Gly Thr
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Tyr Thr Pro Leu Pro Ala Gly Tyr Val Thr Lys Glu Leu Glu Tyr Phe
1125 1130 1135

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tacgtttttt gtattttttc ataagatgtg tcatatgtat taaatcgtgg taatgaaaaa 180
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Met

1

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Glu Glu Asn Asn Gln Asn Gln Cys Ile Pro Tyr Asn Cys Leu Ser Asn	
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Pro Glu Glu Val Leu Leu Asp Gly Glu Arg Ile Ser Thr Gly Asn Ser	
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Ser Ile Asp Ile Ser Leu Ser Leu Val Gln Phe Met Val Ser Asn Phe	
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Val Pro Gly Gly Gly Phe Leu Val Gly Leu Ile Asp Phe Val Trp Gly	
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Ile Val Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile Glu Gln	
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tta att aat gaa aga ata gct gaa ttt gct agg aat gct gct att gct	524
Leu Ile Asn Glu Arg Ile Ala Glu Phe Ala Arg Asn Ala Ala Ile Ala	
85 90 95	
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Asn Leu Glu Gly Leu Glu Asn Asn Leu Asn Ile Tyr Val Glu Ala Phe	
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Lys Glu Trp Glu Glu Asp Pro Asn Asn Pro Glu Thr Arg Thr Arg Val	
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Ile Asp Arg Phe Arg Ile Leu Asp Gly Leu Leu Glu Arg Asp Ile Pro	
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Gly Glu Arg Trp Gly Leu Thr Thr Ile Asn Val Asn Glu Asn Tyr Asn	
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Arg Leu Ile Arg His Ile Asp Glu Tyr Ala Asp His Cys Ala Asn Thr	
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Tyr Asn Arg Gly Leu Asn Asn Leu Pro Lys Ser Thr Tyr Gln Asp Trp	
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Ile Ala Ala Phe Phe Pro Asn Tyr Asp Asn Arg Arg Tyr Pro Ile Gln	
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Pro Val Gly Gln Leu Thr Arg Glu Val Tyr Thr Asp Pro Leu Ile Asn	
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Phe Asn Pro Gln Leu Gln Ser Val Ala Gln Leu Pro Thr Phe Asn Val	
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Asn Leu Thr Ile Phe Thr Asp Trp Phe Ser Val Gly Arg Asn Phe Tyr	
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Trp Gly Gly His Arg Val Ile Ser Ser Leu Ile Gly Gly Gly Asn Ile	
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Thr Ser Pro Ile Tyr Gly Arg Glu Ala Asn Gln Glu Pro Pro Arg Ser	
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Val Glu Gly Val Glu Phe Ser Thr Pro Thr Asn Ser Phe Thr Tyr Arg	
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Gly Arg Gly Thr Val Asp Ser Leu Thr Glu Leu Pro Pro Glu Asp Asn	
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Ser Trp Thr His Arg Ser Ala Thr Leu Thr Asn Thr Ile Asp Pro Glu	
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Arg Ile Asn Gln Ile Pro Leu Val Lys Gly Phe Arg Val Trp Gly Gly	
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Arg Gly Trp Arg Gly Ser Thr Asp Ile Thr Ile Gln Gly Gly Asp Asp	
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Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile Asp Glu Ser Lys Leu Lys Ala	
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Glu Ile Tyr Leu Ile Arg Tyr Asn Ala Lys His Glu Ile Val Asn Val	
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His His Phe Thr Leu Asp Ile Asp Val Gly Cys Thr Asp Leu Asn Glu	
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<213> Bacillus thuringiensis

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Thr	Phe	Val	Gln	Arg	Ser	Gly	Thr	Pro	Phe	Leu	Thr	Thr	Gly	Val	Val	
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Glu	Arg	Ile	Asn	Gln	Ile	Pro	Leu	Val	Lys	Gly	Phe	Arg	Val	Trp	Gly	
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Gly	Glu	Asn	Leu	Thr	Ser	Arg	Thr	Phe	Arg	Tyr	Thr	Asp	Phe	Ser	Asn	565	570	575	
Pro	Phe	Ser	Phe	Arg	Ala	Asn	Pro	Asp	Ile	Ile	Gly	Ile	Ser	Glu	Gln	580	585	590	
Pro	Leu	Phe	Gly	Ala	Gly	Ser	Ile	Ser	Ser	Gly	Glu	Leu	Tyr	Ile	Asp	595	600	605	
Lys	Ile	Glu	Ile	Ile	Leu	Ala	Asp	Ala	Thr	Phe	Glu	Ala	Glu	Ser	Asp	610	615	620	
Leu	Glu	Arg	Ala	Gln	Lys	Ala	Val	Asn	Ala	Leu	Phe	Thr	Ser	Ser	Asn	625	630	635	640
Gln	Ile	Gly	Leu	Lys	Thr	Asp	Val	Thr	Asp	Tyr	His	Ile	Asp	Gln	Val	645	650	655	
Ser	Asn	Leu	Val	Asp	Cys	Leu	Ser	Asp	Glu	Phe	Cys	Leu	Asp	Glu	Lys	660	665	670	
Arg	Glu	Leu	Ser	Glu	Lys	Val	Lys	His	Ala	Lys	Arg	Leu	Ser	Asp	Glu	675	680	685	
Arg	Asn	Leu	Leu	Gln	Asp	Pro	Asn	Phe	Arg	Gly	Ile	Asn	Arg	Gln	Pro	690	695	700	
Asp	Arg	Gly	Trp	Arg	Gly	Ser	Thr	Asp	Ile	Thr	Ile	Gln	Gly	Gly	Asp	705	710	715	720
Asp	Val	Phe	Lys	Glu	Asn	Tyr	Val	Thr	Leu	Pro	Gly	Thr	Val	Asp	Glu	725	730	735	
Cys	Tyr	Pro	Thr	Tyr	Leu	Tyr	Gln	Lys	Ile	Asp	Glu	Ser	Lys	Leu	Lys	740	745	750	
Ala	Tyr	Thr	Arg	Tyr	Glu	Leu	Arg	Gly	Tyr	Ile	Glu	Asp	Ser	Gln	Asp	755	760	765	
Leu	Glu	Ile	Tyr	Leu	Ile	Arg	Tyr	Asn	Ala	Lys	His	Glu	Ile	Val	Asn	770	775	780	
Val	Pro	Gly	Thr	Gly	Ser	Leu	Trp	Pro	Leu	Ser	Ala	Gln	Ser	Pro	Ile	785	790	795	800
Gly	Lys	Cys	Gly	Glu	Pro	Asn	Arg	Cys	Ala	Pro	His	Leu	Glu	Trp	Asn	805	810	815	

Pro	Asp	Leu	Asp	Cys	Ser	Cys	Arg	Asp	Gly	Glu	Lys	Cys	Ala	His	His		
			820					825					830				
Ser	His	His	Phe	Thr	Leu	Asp	Ile	Asp	Val	Gly	Cys	Thr	Asp	Leu	Asn		
		835					840					845					
Glu	Asp	Leu	Gly	Val	Trp	Val	Ile	Phe	Lys	Ile	Lys	Thr	Gln	Asp	Gly		
	850					855					860						
His	Ala	Arg	Leu	Gly	Asn	Leu	Glu	Phe	Leu	Glu	Glu	Lys	Pro	Leu	Leu		
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Gly	Glu	Ala	Leu	Ala	Arg	Val	Lys	Arg	Ala	Glu	Lys	Lys	Trp	Arg	Asp		
			885						890					895			
Lys	Arg	Glu	Lys	Leu	Gln	Leu	Glu	Thr	Asn	Ile	Val	Tyr	Lys	Glu	Ala		
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Lys	Glu	Ser	Val	Asp	Ala	Leu	Phe	Val	Asn	Ser	Gln	Tyr	Asp	Arg	Leu		
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Gln	Val	Asp	Thr	Asn	Ile	Ala	Met	Ile	His	Ala	Ala	Asp	Lys	Arg	Val		
	930					935					940						
His	Arg	Ile	Arg	Glu	Ala	Tyr	Leu	Pro	Glu	Leu	Ser	Val	Ile	Pro	Gly		
945				950					955						960		
Val	Asn	Ala	Ala	Ile	Phe	Glu	Glu	Leu	Glu	Gly	Arg	Ile	Phe	Thr	Ala		
			965					970						975			
Tyr	Ser	Leu	Tyr	Asp	Ala	Arg	Asn	Val	Ile	Lys	Asn	Gly	Asp	Phe	Asn		
		980						985					990				
Asn	Gly	Leu	Leu	Cys	Trp	Asn	Val	Lys	Gly	His	Val	Asp	Val	Glu	Glu		
	995					1000						1005					
Gln	Asn	Asn	His	Arg	Ser	Val	Leu	Val	Ile	Pro	Glu	Trp	Glu	Ala	Glu		
	1010					1015					1020						
Val	Ser	Gln	Glu	Val	Arg	Val	Cys	Pro	Gly	Arg	Gly	Tyr	Ile	Leu	Arg		
025				1030					1035					1040			
Val	Thr	Ala	Tyr	Lys	Glu	Gly	Tyr	Gly	Glu	Gly	Cys	Val	Thr	Ile	His		
			1045					1050					1055				
Glu	Ile	Glu	Asp	Asn	Thr	Asp	Glu	Leu	Lys	Phe	Ser	Asn	Cys	Val	Glu		
		1060					1065					1070					
Glu	Glu	Val	Tyr	Pro	Asn	Asn	Thr	Val	Thr	Cys	Asn	Asn	Tyr	Thr	Gly		
	1075					1080						1085					

Thr Gln Glu Glu Tyr Glu Gly Thr Tyr Thr Ser Arg Asn Gln Gly Tyr
 1090 1095 1100

Asp Glu Ala Tyr Gly Asn Asn Pro Ser Val Pro Ala Asp Tyr Ala Ser
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Val Tyr Glu Glu Lys Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys
 1125 1130 1135

Glu Ser Asn Arg Gly Tyr Gly Asp Tyr Thr Pro Leu Pro Ala Gly Tyr
 1140 1145 1150

Val Thr Lys Asp Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile
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 Asn His Ser Ala Gln Met Asp Leu Leu Pro Asp Ala Arg Ile Glu Asp
 20 25 30
 agc ttg tgt ata gcc gag ggg aac aat att gat cca ttt gtt agc gca 144
 Ser Leu Cys Ile Ala Glu Gly Asn Asn Ile Asp Pro Phe Val Ser Ala
 35 40 45
 tca aca gtc caa acg ggt att aac ata gct ggt aga ata cta ggc gta 192
 Ser Thr Val Gln Thr Gly Ile Asn Ile Ala Gly Arg Ile Leu Gly Val
 50 55 60
 ttg ggc gta ccg ttt gct gga caa cta gct agt ttt tat agt ttt ctt 240
 Leu Gly Val Pro Phe Ala Gly Gln Leu Ala Ser Phe Tyr Ser Phe Leu
 65 70 75 80
 gtt ggt gaa tta tgg ccc cgc ggc aga gat cag tgg gaa att ttc cta 288

Val	Gly	Glu	Leu	Trp	Pro	Arg	Gly	Arg	Asp	Gln	Trp	Glu	Ile	Phe	Leu		
				85					90					95			
gaa	cat	gtc	gaa	caa	ctt	ata	aat	caa	caa	ata	aca	gaa	aat	gct	agg		336
Glu	His	Val	Glu	Gln	Leu	Ile	Asn	Gln	Gln	Ile	Thr	Glu	Asn	Ala	Arg		
			100					105					110				
aat	acg	gct	ctt	gct	cga	tta	caa	ggg	tta	gga	gat	tcc	ttc	aga	gcc		384
Asn	Thr	Ala	Leu	Ala	Arg	Leu	Gln	Gly	Leu	Gly	Asp	Ser	Phe	Arg	Ala		
			115					120					125				
tat	caa	cag	tca	ctt	gaa	gat	tgg	cta	gaa	aac	cgt	gat	gat	gca	aga		432
Tyr	Gln	Gln	Ser	Leu	Glu	Asp	Trp	Leu	Glu	Asn	Arg	Asp	Asp	Ala	Arg		
	130					135					140						
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Thr	Arg	Ser	Val	Leu	His	Thr	Gln	Tyr	Ile	Ala	Leu	Glu	Leu	Asp	Phe		
145					150					155					160		
ctt	aat	gcg	atg	ccg	ctt	ttc	gca	att	aga	aac	caa	gaa	gtt	cca	tta		528
Leu	Asn	Ala	Met	Pro	Leu	Phe	Ala	Ile	Arg	Asn	Gln	Glu	Val	Pro	Leu		
				165					170					175			
ttg	atg	gta	tat	gct	caa	gct	gca	aat	tta	cac	cta	tta	tta	ttg	aga		576
Leu	Met	Val	Tyr	Ala	Gln	Ala	Ala	Asn	Leu	His	Leu	Leu	Leu	Leu	Arg		
			180				185						190				
gat	gcc	tct	ctt	ttt	ggg	agt	gaa	ttt	ggg	ctt	aca	tcg	cag	gaa	att		624
Asp	Ala	Ser	Leu	Phe	Gly	Ser	Glu	Phe	Gly	Leu	Thr	Ser	Gln	Glu	Ile		
		195					200					205					
caa	cgc	tat	tat	gag	cgc	caa	gtg	gaa	cga	acg	aga	gat	tat	tcc	gac		672
Gln	Arg	Tyr	Tyr	Glu	Arg	Gln	Val	Glu	Arg	Thr	Arg	Asp	Tyr	Ser	Asp		
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tat	tgc	gta	gaa	tgg	tat	aat	aca	ggg	cta	aat	agc	ttg	aga	ggg	aca		720
Tyr	Cys	Val	Glu	Trp	Tyr	Asn	Thr	Gly	Leu	Asn	Ser	Leu	Arg	Gly	Thr		
225					230				235					240			
aat	gcc	gca	agt	tgg	gta	cgg	tat	aat	caa	ttc	cgt	aga	gat	cta	acg		768
Asn	Ala	Ala	Ser	Trp	Val	Arg	Tyr	Asn	Gln	Phe	Arg	Arg	Asp	Leu	Thr		
				245					250					255			
tta	gga	gta	tta	gat	cta	gtg	gca	cta	ttc	cca	agc	tat	gac	act	cgc		816
Leu	Gly	Val	Leu	Asp	Leu	Val	Ala	Leu	Phe	Pro	Ser	Tyr	Asp	Thr	Arg		
			260					265					270				
act	tat	cca	ata	aat	acg	agt	gct	cag	tta	aca	aga	gaa	gtt	tat	aca		864
Thr	Tyr	Pro	Ile	Asn	Thr	Ser	Ala	Gln	Leu	Thr	Arg	Glu	Val	Tyr	Thr		
		275					280					285					
gac	gca	att	gga	gca	aca	ggg	gta	aat	atg	gca	agt	atg	aat	tgg	tat		912
Asp	Ala	Ile	Gly	Ala	Thr	Gly	Val	Asn	Met	Ala	Ser	Met	Asn	Trp	Tyr		

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Asn Asn Asn Ala Pro Ser Phe Ser Ala Ile Glu Ala Ala Ala Ile Arg			
305	310	315	320
agc ccg cat cta ctt gat ttt cta gaa caa ctt aca att ttt agc gct			1008
Ser Pro His Leu Leu Asp Phe Leu Glu Gln Leu Thr Ile Phe Ser Ala			
	325	330	335
tca tca cga tgg agt aat act agg cat atg act tat tgg cgg ggg cac			1056
Ser Ser Arg Trp Ser Asn Thr Arg His Met Thr Tyr Trp Arg Gly His			
	340	345	350
acg att caa tct cgg cca ata gga ggc gga tta aat acc tca acg cat			1104
Thr Ile Gln Ser Arg Pro Ile Gly Gly Gly Leu Asn Thr Ser Thr His			
	355	360	365
ggg gct acc aat act tct att aat cct gta aca tta cgg ttc gca tct			1152
Gly Ala Thr Asn Thr Ser Ile Asn Pro Val Thr Leu Arg Phe Ala Ser			
	370	375	380
cga gac gtt tat agg act gaa tca tat gca gga gtg ctt cta tgg gga			1200
Arg Asp Val Tyr Arg Thr Glu Ser Tyr Ala Gly Val Leu Leu Trp Gly			
385	390	395	400
att tac ctt gaa cct att cat ggt gtc cct act gtt agg ttt aat ttt			1248
Ile Tyr Leu Glu Pro Ile His Gly Val Pro Thr Val Arg Phe Asn Phe			
	405	410	415
acg aac cct cag aat att tct gat aga ggt acc gct aac tat agt caa			1296
Thr Asn Pro Gln Asn Ile Ser Asp Arg Gly Thr Ala Asn Tyr Ser Gln			
	420	425	430
cct tat gag tca cct ggg ctt caa tta aaa gat tca gaa act gaa tta			1344
Pro Tyr Glu Ser Pro Gly Leu Gln Leu Lys Asp Ser Glu Thr Glu Leu			
	435	440	445
cca cca gaa aca aca gaa cga cca aat tat gaa tct tac agt cac agg			1392
Pro Pro Glu Thr Thr Glu Arg Pro Asn Tyr Glu Ser Tyr Ser His Arg			
	450	455	460
tta tct cat ata ggt ata att tta caa tcc agg gtg aat gta ccg gta			1440
Leu Ser His Ile Gly Ile Ile Leu Gln Ser Arg Val Asn Val Pro Val			
465	470	475	480
tat tct tgg acg cat cgt agt gca gat cgt acg aat acg att gga cca			1488
Tyr Ser Trp Thr His Arg Ser Ala Asp Arg Thr Asn Thr Ile Gly Pro			
	485	490	495
aat aga atc acc caa atc cca atg gta aaa gca tcc gaa ctt cct caa			1536
Asn Arg Ile Thr Gln Ile Pro Met Val Lys Ala Ser Glu Leu Pro Gln			
	500	505	510

ggt acc act gtt gtt aga gga cca gga ttt act ggt ggg gat att ctt	1584
Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu	
515 520 525	
cga aga acg aat act ggt gga ttt gga ccg ata aga gta act gtt aac	1632
Arg Arg Thr Asn Thr Gly Gly Phe Gly Pro Ile Arg Val Thr Val Asn	
530 535 540	
gga cca tta aca caa aga tat cgt ata gga ttc cgc tat gct tca act	1680
Gly Pro Leu Thr Gln Arg Tyr Arg Ile Gly Phe Arg Tyr Ala Ser Thr	
545 550 555 560	
gta gat ttt gat ttc ttt gta tca cgt gga ggt act act gta aat aat	1728
Val Asp Phe Asp Phe Phe Val Ser Arg Gly Gly Thr Thr Val Asn Asn	
565 570 575	
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Phe Arg Phe Leu Arg Thr Met Asn Ser Gly Asp Glu Leu Lys Tyr Gly	
580 585 590	
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Asn Phe Val Arg Arg Ala Phe Thr Thr Pro Phe Thr Phe Thr Gln Ile	
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Gln Asp Ile Ile Arg Thr Ser Ile Gln Gly Leu Ser Gly Asn Gly Glu	
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Val Tyr Ile Asp Lys Ile Glu Ile Ile Pro Val Thr Ala Thr Phe Glu	
625 630 635 640	
gca gaa tat gat tta gaa aga gcg caa gag gcg gtg aat gct ctg ttt	1968
Ala Glu Tyr Asp Leu Glu Arg Ala Gln Glu Ala Val Asn Ala Leu Phe	
645 650 655	
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Thr Asn Thr Asn Pro Arg Arg Leu Lys Thr Asp Val Thr Asp Tyr His	
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Ile Asp Gln Val Ser Asn Leu Val Ala Cys Leu Ser Asp Glu Phe Cys	
675 680 685	
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Leu Asp Glu Lys Arg Glu Leu Leu Glu Lys Val Lys Tyr Ala Lys Arg	
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Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn Phe Thr Ser Ile	
705 710 715 720	
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Asn Lys Gln Pro Asp Phe Ile Ser Thr Asn Glu Gln Ser Asn Phe Thr	
725 730 735	
tct atc cat gaa caa tct gaa cat gga tgg tgg gga agt gag aac att	2256
Ser Ile His Glu Gln Ser Glu His Gly Trp Trp Gly Ser Glu Asn Ile	
740 745 750	
acc atc cag gaa gga aat gac gta ttt aaa gag aat tac gtc aca cta	2304
Thr Ile Gln Glu Gly Asn Asp Val Phe Lys Glu Asn Tyr Val Thr Leu	
755 760 765	
ccg ggt act ttt aat gag tgt tat ccg acg tat tta tat caa aaa ata	2352
Pro Gly Thr Phe Asn Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile	
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Gly Glu Ser Glu Leu Lys Ala Tyr Thr Arg Tyr Gln Leu Arg Gly Tyr	
785 790 795 800	
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Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr Asn Ala	
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Lys His Glu Thr Leu Asp Val Pro Gly Thr Glu Ser Leu Trp Pro Leu	
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Ser Val Glu Ser Pro Ile Gly Arg Cys Gly Glu Pro Asn Arg Cys Ala	
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Pro His Phe Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg Asp Gly	
850 855 860	
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Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile Asp Val	
865 870 875 880	
gga tgc aca gac ttg cat gag aat cta ggc gtg tgg gtg gta ttc aag	2688
Gly Cys Thr Asp Leu His Glu Asn Leu Gly Val Trp Val Val Phe Lys	
885 890 895	
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Ile Lys Thr Gln Glu Gly His Ala Arg Leu Gly Asn Leu Glu Phe Ile	
900 905 910	
gaa gag aaa cca tta tta gga gaa gca ctg tct cgt gtg aag agg gca	2784
Glu Glu Lys Pro Leu Leu Gly Glu Ala Leu Ser Arg Val Lys Arg Ala	
915 920 925	
gag aaa aaa tgg aga gac aaa cgt gaa aaa cta caa ttg gaa aca aaa	2832
Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Gln Leu Glu Thr Lys	

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Arg Val Tyr Thr Glu Ala Lys Glu Ala Val Asp Ala Leu Phe Val Asp			
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Ala Ala Asp Lys Leu Val His Arg Ile Arg Glu Ala Tyr Leu Ser Glu			
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Leu Pro Val Ile Pro Gly Val Asn Ala Glu Ile Phe Glu Glu Leu Glu			
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Val Lys Asn Gly Asp Phe Asn Asn Gly Leu Thr Cys Trp Asn Val			
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Val Ile Pro Glu Trp Glu Ala Glu Val Ser Gln Ala Val Arg Val			
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Cys Pro Gly Cys Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu			
	1070	1075 1080	
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Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn			
	1085	1090 1095	
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Thr Asp Glu Leu Lys Phe Lys Asn Arg Glu Glu Glu Glu Val Tyr			
	1100	1105 1110	
cca acg gat aca gga acg tgt aat gat tat act gca cac caa ggt			3384
Pro Thr Asp Thr Gly Thr Cys Asn Asp Tyr Thr Ala His Gln Gly			
	1115	1120 1125	
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Thr Ala Gly Cys Ala Asp Ala Cys Asn Ser Arg Asn Ala Gly Tyr			
	1130	1135 1140	

85

90

95

Glu His Val Glu Gln Leu Ile Asn Gln Gln Ile Thr Glu Asn Ala Arg
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Asn Thr Ala Leu Ala Arg Leu Gln Gly Leu Gly Asp Ser Phe Arg Ala
 115 120 125

Tyr Gln Gln Ser Leu Glu Asp Trp Leu Glu Asn Arg Asp Asp Ala Arg
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Thr Arg Ser Val Leu His Thr Gln Tyr Ile Ala Leu Glu Leu Asp Phe
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Leu Asn Ala Met Pro Leu Phe Ala Ile Arg Asn Gln Glu Val Pro Leu
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Leu Met Val Tyr Ala Gln Ala Ala Asn Leu His Leu Leu Leu Leu Arg
 180 185 190

Asp Ala Ser Leu Phe Gly Ser Glu Phe Gly Leu Thr Ser Gln Glu Ile
 195 200 205

Gln Arg Tyr Tyr Glu Arg Gln Val Glu Arg Thr Arg Asp Tyr Ser Asp
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Tyr Cys Val Glu Trp Tyr Asn Thr Gly Leu Asn Ser Leu Arg Gly Thr
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Asn Ala Ala Ser Trp Val Arg Tyr Asn Gln Phe Arg Arg Asp Leu Thr
 245 250 255

Leu Gly Val Leu Asp Leu Val Ala Leu Phe Pro Ser Tyr Asp Thr Arg
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Ser Pro His Leu Leu Asp Phe Leu Glu Gln Leu Thr Ile Phe Ser Ala
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Gly Ala Thr Asn Thr Ser Ile Asn Pro Val Thr Leu Arg Phe Ala Ser
370 375 380

Arg Asp Val Tyr Arg Thr Glu Ser Tyr Ala Gly Val Leu Leu Trp Gly
385 390 395 400

Ile Tyr Leu Glu Pro Ile His Gly Val Pro Thr Val Arg Phe Asn Phe
405 410 415

Thr Asn Pro Gln Asn Ile Ser Asp Arg Gly Thr Ala Asn Tyr Ser Gln
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Pro Tyr Glu Ser Pro Gly Leu Gln Leu Lys Asp Ser Glu Thr Glu Leu
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660 665 670

Ile Asp Gln Val Ser Asn Leu Val Ala Cys Leu Ser Asp Glu Phe Cys
675 680 685

Leu Asp Glu Lys Arg Glu Leu Leu Glu Lys Val Lys Tyr Ala Lys Arg
690 695 700

Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn Phe Thr Ser Ile
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Asn Lys Gln Pro Asp Phe Ile Ser Thr Asn Glu Gln Ser Asn Phe Thr

725

730

735

Ser Ile His Glu Gln Ser Glu His Gly Trp Trp Gly Ser Glu Asn Ile
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Thr Ile Gln Glu Gly Asn Asp Val Phe Lys Glu Asn Tyr Val Thr Leu
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Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr Asn Ala
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Lys His Glu Thr Leu Asp Val Pro Gly Thr Glu Ser Leu Trp Pro Leu
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Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile Asp Val
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Gly Cys Thr Asp Leu His Glu Asn Leu Gly Val Trp Val Val Phe Lys
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Ile Lys Thr Gln Glu Gly His Ala Arg Leu Gly Asn Leu Glu Phe Ile
900 905 910

Glu Glu Lys Pro Leu Leu Gly Glu Ala Leu Ser Arg Val Lys Arg Ala
915 920 925

Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Gln Leu Glu Thr Lys
930 935 940

Arg Val Tyr Thr Glu Ala Lys Glu Ala Val Asp Ala Leu Phe Val Asp
945 950 955 960

Ser Gln Tyr Asp Arg Leu Gln Ala Asp Thr Asn Ile Gly Met Ile His
965 970 975

Ala Ala Asp Lys Leu Val His Arg Ile Arg Glu Ala Tyr Leu Ser Glu
980 985 990

Leu Pro Val Ile Pro Gly Val Asn Ala Glu Ile Phe Glu Glu Leu Glu
995 1000 1005

Gly His Ile Ile Thr Ala Ile Ser Leu Tyr Asp Ala Arg Asn Val
1010 1015 1020

Val Lys Asn Gly Asp Phe Asn Asn Gly Leu Thr Cys Trp Asn Val
1025 1030 1035

Lys Gly His Val Asp Val Gln Gln Ser His His Arg Ser Asp Leu
1040 1045 1050

Val Ile Pro Glu Trp Glu Ala Glu Val Ser Gln Ala Val Arg Val
1055 1060 1065

Cys Pro Gly Cys Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu
1070 1075 1080

Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn
1085 1090 1095

Thr Asp Glu Leu Lys Phe Lys Asn Arg Glu Glu Glu Glu Val Tyr
1100 1105 1110

Pro Thr Asp Thr Gly Thr Cys Asn Asp Tyr Thr Ala His Gln Gly
1115 1120 1125

Thr Ala Gly Cys Ala Asp Ala Cys Asn Ser Arg Asn Ala Gly Tyr
1130 1135 1140

Glu Asp Ala Tyr Glu Val Asp Thr Thr Ala Ser Val Asn Tyr Lys
1145 1150 1155

Pro Thr Tyr Glu Glu Glu Thr Tyr Thr Asp Val Arg Arg Asp Asn
1160 1165 1170

His Cys Glu Tyr Asp Arg Gly Tyr Val Asn Tyr Pro Pro Val Pro
1175 1180 1185

Ala Gly Tyr Val Thr Lys Glu Leu Glu Tyr Phe Pro Glu Thr Asp
1190 1195 1200

Thr Val Trp Ile Glu Ile Gly Glu Thr Glu Gly Lys Phe Ile Val
1205 1210 1215

Asp Ser Val Glu Leu Leu Leu Met Glu Glu
1220 1225